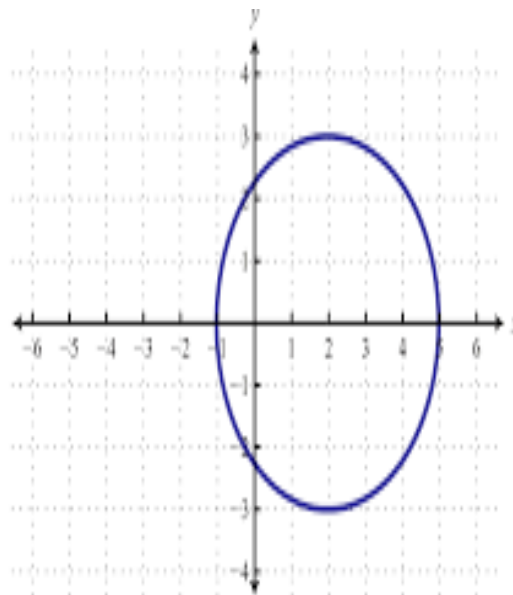


Warm Up:

Find the domain and range of each function.

x	y
-2	-2
-1	2
0	6
1	10
2	14



Domain: $-2, -1, 0, 1, 2$
Range: $-2, 2, 6, 10, 14$

Homework Check:

- 8.** domain $\{3\}$, range $\{-2, 1, 4, 7, 8\}$; no
- 9.** domain $\{1, 5, 6, 7\}$, range $\{-8, -7, 4, 5\}$; yes
- 10.** domain $\{0.04, 0.2, 1, 5\}$, range $\{0.2, 1, 5, 25\}$; yes
- 11.** domain $\{0, 1, 4\}$, range $\{-2, -1, 0, 1, 2\}$; no
- 12.** not a function **13.** not a function
- 14.** function **15.** function

Function Form:

$$y = 4x + 2$$

Function form gets rid of the y.

$$f(x) = 4x + 2$$

$$f(0) = 4(0) + 2$$

$$= 2$$

$$f(1) = 4(1) + 2$$

$$f(1) = 6$$

$$f(-1) =$$

$$y = 4x + 2$$

x	y
0	2
1	6
-1	-2

Evaluating Functions

To evaluate a function, simply substitute a value or expression for x !

Evaluate the function for $x = -4$ (or $f(-4)$).

$$f(x) = -2x - 6$$

$$\begin{aligned} f(-4) &= -2(-4) - 6 \\ &= 8 - 6 \\ &= 2 \end{aligned}$$

1. Find $f(4)$ if $y = 4x - 1$.

$$f(x) = 4x - 1$$

$$\begin{aligned} f(4) &= 16 - 1 \\ &= 15 \end{aligned}$$

$$\frac{x}{4} \Big| y$$

$$\frac{x}{-2} \Big| y$$

2. Evaluate $f(x) = 2x - 3$ when $x = -2$

$$f(x) = 2x - 3 \quad x = -2$$

$$f(-2) = 2(-2) - 3$$

$$f(-2) = -4 - 3$$

$$f(-2) = -7$$

$$\text{If } f(x) = -3x - 10$$

Find $f(-2)$, $f(0)$ and $f(3)$

$$\begin{aligned} f(-2) &= -3x - 10 \\ &= -3(-2) - 10 \\ &= 4 \end{aligned}$$

$$f(0) = -10$$

$$f(3) = -19$$

Composite Functions

If $f(x) = 2x + 3$ and $g(x) = -3x - 1$, Find $f(g(4))$ and $g(f(4))$

$$f(x) = 2x + 3$$

$$f(4) = 2(4) + 3$$

$$= 11$$

$$g(f(x)) = -3(2x+3) - 1$$

$$g(f(4)) = -3(2(4)+3) - 1$$

$$= -3(8+3) - 1$$

$$= -3(11) - 1$$

$$= -33 - 1$$

$$= -34$$

$$f(g(x)) = 2(-3x-1) + 3$$

$$f(g(4)) = 2(-3(4)-1) + 3$$

$$= 2(-12-1) + 3$$

$$= 2(-13) + 3$$

$$= -26 + 3$$

$$= -23$$

$$f(x) = 2x + 3 \text{ and } g(x) = -x^2 + 5$$

Find $f(g(-2))$

$$f(g(x)) = 2(-x^2 + 5) + 3$$

$$f(g(-2)) = 2(-(-2)^2 + 5) + 3$$

$$2(-4 + 5) + 3$$

$$2(1) + 3$$

$$5$$

Challenge!

$$f(x) = x + 2$$

$$g(x) = 5 - x$$

$$h(x) = -x^2 - 2x + 3$$

Find $f(g(h(2)))$

$$f(g(x)) = (5-x) + 2$$

$$f(g(h(x))) = (5 - (-x^2 - 2x + 3)) + 2$$

$$f(g(h(2))) = (5 - (-2^2 - 2(2) + 3)) + 2$$

$$(5 - (4 - 4) + 3) + 2$$

$$(5 - 0) + 3 + 2$$

$$8 + 2$$

$$10$$

